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## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

**Boston Society of Natural History.**—Prof. W. Putnam, the president, announced the death of Leo Lequereaux, of Columbus, O., a corresponding member. Dr. Thomas Dwight read a paper on “The Joints and Muscles of Contortionists,” illustrated by stereopticon. He said that there were contortionists in ancient Egypt, but very poor ones. Those of Greece and Rome were better, but those of modern times have still more ability. He showed some pictures of mediæval and modern contortionists in different positions, and said that for backward contortion no very great variation from the normal in anatomical structure was required, but there must be a large amount of gristle in the spinal column, as is the case in all children. In forward work, however, an abnormal structure is required, as the contortionist must have the power to partly dislocate his joints in order to get his limbs into the required positions. The performers of both classes must be able to relax the antagonistic muscles,—that is, those that pull in an opposite direction to which it is desired to bend.

Secretary Fewkes then read a communication from Prof. G. Fredrick Wright, of Oberlin, in regard to a little carved figure of a man that was thrown up from a depth of three hundred and twenty feet below the surface of the ground, while boring for an artesian well at Nampa, I. T. This was accompanied by an opinion from Prof. S. F. Emmons, that the formation from which the figure came was older than any other where human implements have previously been found. The gentlemen who took part in the discussion were Profs. Putnam, H. W. Haines, Edward S. Morse, S. H. Scudder, and E. D. Cope, and Mr. Warren Upham. Prof. Cope stated that the formation underlying the lava bed in that part of Idaho, is the Pliocene lacustrine deposit, which he had called the Idaho Terrane. The general opinion seemed to be that the image was authentic, and that it was carved in the late tertiary period by a member of a race that was far advanced in development for so remote a period. Mr. Scudder was the only speaker who dissented from this opinion.

**American Geological Society.**—The annual meeting was held December 26–28, 1889, at the American Museum of Natural History, New York. The following papers were read December 26th: Some Additional Evidences Bearing on the Interval between the Leading Glacial Epochs; T. C. Chamberlain, Madison, Wis. The Tertiaries of Massa-

chusetts; N. H. Shaler. The Laramie Group; J. S. Newberry, New York. On Glacial Phenomena in Canada; Robert Bell, Ottawa, Canada. Orographic Movements in the Rocky Mountains; S. F. Emmons, Washington, D. C. Note on the Serpentine of Syracuse; Geo. H. Williams, Baltimore, Md. Remarks on the Surface Geology of Alaska; I. C. Russell, Washington, D. C. Origin of the Rock Pressure of Natural Gas in the Trenton Limestone of Ohio and Indiana; Edward Orton, Columbus, Ohio. On the Tertiary Deposits of the Cape Fear River Region; William B. Clark, Baltimore, Md. Note on the Pre-Palæozoic Surface of the Archæan Terranes of Canada; Andrew C. Lawson, Ottawa, Canada.

December 27th.—The Structure and Origin of Glacial Sand Plains; William M. Davis, Cambridge, Mass. Glacial Features of Parts of the Yukon and Mackenzie Basins; R. G. McConnell, Ottawa, Canada. Post-Tertiary Deposits of Manitoba and the Adjoining Territories of Canada; J. B. Tyrrell, Ottawa, Canada. A Moraine of Retrocession in Ontario; G. Frederick Wright, Oberlin, Ohio. The Southern Extension of the Appomattox Formation; W. J. McGee, Washington, D. C. The Value of the Hudson River Group" in Geologic Nomenclature; Charles D. Walcott, Washington, D. C. The Calcareous Formation in the Champlain Valley; Ezra Brainerd and H. M. Seely, Middlebury, Vt. The Fort Cassin Rocks and their Fauna; R. P. Whitfield, New York. The Stratigraphy of the Quebec Group; R. W. Ells, Ottawa, Canada. Geological and Petrographical Observations in Southern and Western Norway; Geo. H. Williams, Baltimore, Md. Cretaceous Plants from Martha's Vineyard; C. D. White, Washington, D. C. The Sandstone Dikes of the Forks of Cottonwood Creek, in Tehama and Shasta Counties, California; J. S. Diller, Washington, D. C. On the Relation between the Mineral Composition and the Geological Occurrence of the Igneous Rocks at Electric Peak and Sepulchre Mt., Yellowstone National Park; Jos. P. Iddings, Washington, D. C. On Certain Peculiar Structural Features in the Foothill Region of the Rocky Mountains near Denver, Colorado; Geo. H. Eldridge, Washington, D. C. Illustrations of the Glaciers in the Selkirk Mts. and Alaska; A. S. Bickmore, New York.

December 28th.—Some Results of Archæan Studies; Alexander Winchell, Ann Arbor, Mich. Significance of granitoid oval areas in the Laurentian; C. H. Hitchcock, Hanover, N. H. Porphyritic Granite; B. K. Emerson, Amherst, Mass. The internal relations and taxonomy of the Archæan of Central Canada; Andrew C. Lawson,

Ottawa, Canada. The Crystalline Schists of the Black Hills of Dakota; C. R. Van Hise, Madison, Wisconsin. On the intrusive origin of the Triassic Traps of New Jersey, with special reference to Watchung Mountains; Frank L. Nason, New Brunswick, N. J. The Geology of the Crazy Mountains, Montana; J. E. Wolff, Cambridge, Mass. The Cuboides Zone and its Fauna, A discussion of methods of correlation; H. S. Williams, Ithaca, N. Y. On the Pleistocene Flora of Canada: Abstract; Sir William Dawson and D. P. Penhallow, Montreal, Canada. The Fiords and Great Lake Basins of North America considered as evidence of preglacial continental elevation and of depression during the glacial period; Warren Upham, Somerville, Mass. On the Genus *Spirifera* and its inter-relations with the Genera *Spiriferina*, *Syringothyris*, *Crytia*, and *Cryotina*: Abstract; James Hall, Albany, N. Y. On some Ancient Shore-lines and their history; F. J. H. Merrill, New York. Geology of the Boston Basin; W. O. Crosby. On the Collection and Preservation of Geological Photographs by the American Geological Society, and the facilitation of their exchange among its members; J. F. Kemp, Ithaca, N. Y. On the Metamorphic Rocks of south-eastern New York; F. J. H. Merrill, New York. Experiments with Cave Air for cooling and ventilating rooms; M. H. Crump. On some Porphyries of the Plain of Mexico, read by title; Persifer Fraser, Philadelphia, Pa. On the Horned Dinosauria of the Laramie, read by title; E. D. Cope, Philadelphia, Pa. On Pot-holes north of Lake Superior unconnected with existing streams; Peter McKellar, Fort William, Ontario.

The following is an abstract of some of the more important papers read at the meeting.

ON GLACIAL PHENOMENA IN CANADA. Robert Bell, Ottawa, Canada.—Advantages offered by the Dominion for the study of these phenomena. Questions as to interglacial periods. Preglacial or interglacial river valleys. Boulder Clays ploughed by subsequent glaciers. Almost universal glaciation east of the Rocky Mountains. Progressive recession northward of the general glacial condition. Surface decay preceding the glacial period. Directions of striæ and drift transportation. Effects of regional changes of level in the northern part of the continent. Different origins of lake basins. Influence of geological conditions on glacial erosion in the production of geographical features. Did other forms of ice play any part? Examples peculiar to glacial action. Various proofs. Groups of general courses of grooves in different directions. Various forms of moraines, belts, trains, heaps,

beds, and areas of boulders. Erratics remarkable for size, position, etc. Climate and fauna in post-Pliocene times. The paper was illustrated by photographs and diagrams.

THE STRUCTURE AND ORIGIN OF GLACIAL SAND PLAINS. William M. Davis, Cambridge, Mass.—Sand Plains are delta-like deposits of stratified gravel and sand, formed in bodies of standing water at the margin of the melting ice of the last glacial epoch. Their growth was rapid compared to the backward melting of the ice-front, and the pits in their surface mark the location of isolated blocks of ice, which their sands surrounded.

NOTE ON THE PRE-PALÆOZOIC SURFACE OF THE ARCHÆAN TERRANES OF CANADA. Andrew C. Lawson, Ottawa, Canada.—Observations along the northern limit of the Palæozoic show that the surface of the Archæan was, at the time of the deposition of Cambrian or earlier formations, to a large extent as hummocky and *roches moutonnées* as it is to-day. Hence this feature cannot, as it is generally supposed, be due to conditions of glacial epoch except to a very limited extent. Slight reduction of the Archæan surface since early Palæozoic, but enormous previous denudation. Origin of material of post-Archæan formation.

GLACIAL FEATURES OF PARTS OF THE YUKON AND MACKENZIE BASINS. R. G. McConnell, Ottawa, Canada.—This paper contains a brief description of the glacial deposits observed along the Liard and Mackenzie Rivers, and includes notes on the silting up of a southern arm of Great Slave Lake, on the height of Erratics along the eastern flanks of the Rocky Mountains, on the absence of Boulder Clays from the valleys of the Porcupine and the Yukon, and on the former existence of a great lake at the confluence of these two streams.

REMARKS ON THE SURFACE GEOLOGY OF ALASKA. I. C. Russell, Washington, D. C.—The writer wishes to call attention to, first, the formation of the Tundra; second, to the absence of residual clays and other evidences of rock decay and the absence of glacial records along the Yukon and Porcupine Rivers in Alaska.

POST-TERTIARY DEPOSITS ON MANITOBA AND THE ADJOINING TERRITORIES OF CANADA. J. B. Tyrrell, Ottawa, Canada.—The area stretching from the Archæan nucleus in the eastern portion of Manitoba, to near the foot of the Rocky Mountains, has, in preglacial times, had a very irregular surface, which was planed by the passing of the continental glacier, and the irregularities filled often to great depth with unstratified till. This till, or ground moraine, forms the

present surface throughout large districts; but it is covered in many places by stratified sands, silts, and gravels deposited in the beds of larger or smaller fresh-water lakes. The paper describes the character of the till, the direction in which the glacier forming it has moved from the Archæan nucleus, and some of the moraines, drumlins, kames, etc., that it has left in its course; also it states evidences of the recurrence of glacial conditions, and the positions of a number of lakes in which the subsequent deposits were laid down.

A TERMINAL MORaine IN ONTARIO. G. Frederick Wright, Oberlin, Ohio.—In the Report of Progress upon the Geological Survey of Canada, published in 1863, pp. 908, 909, the *Artemisia* gravel is described as a belt of loose gravel extending from Owen Sound to Brantford, and thence in an easterly and northeasterly direction, passing about half way between Lake Ontario and Lake Simcoe, following the highest ground of the peninsula, and being in general about 950 feet above the sea. Lakes with no visible inlet are described as occurring near the greatest elevation. The object of the paper is to give the results of personal investigations during the past summer along this line, demonstrating its morainic character. Many facts which some have attributed to a northern depression at the close of the glacial period receive simple and sufficient explanation from the morainic character of this deposit.

THE SOUTHERN EXTENSION OF THE APPOMATTOX FORMATION. W. J. McGee, Washington, D.C.—The Appomattox formation was applied in 1888 to a widespread deposit of orange-colored sands and clays, with occasional intercalations of gravel, developed on and between the Rappahanock, James, Roanoke, and Appomattox rivers in eastern Virginia, and widening and thickening southward. Recently the same formation has been traced through the Carolinas, Georgia, Alabama, and Mississippi; and has been found to constitute the prevailing surface deposit in these States. It is a marine or brackish water deposit, yielding no fossils save fragmentary cones and bits of lignite. A considerable part of the Orange Sand of Dr. Hilgard belongs to the formation. It lies unconformably upon the Grand Gulf (Miocene?) strata of Alabama and Mississippi as upon the fossiliferous Miocene of eastern Virginia and North Carolina, and it is overlain unconformably by Pliocene deposits in various localities. Although its age has not been determined palæontologically, it forms, by means of its vast extent and uniform character, a great datum formation from which the stratigraphy of the Coastal plain may be reckoned.

THE TERTIARY DEPOSITS OF EASTERN MASSACHUSETTS. N. S. Shaler, Cambridge, Mass.—The main points concern the origin and distribution of these strata. The writer endeavored to show that there has been in that district, since the Miocene time, a large amount of true mountain-building action; and also that a part of the deposits are of Glacial origin.

THE VALUE OF THE TERM "HUDSON RIVER GROUP" IN GEOLOGIC NOMENCLATURE. Chas. D. Walcott, Washington, D. C.—This paper embraces: Description of the rocks referred to the Hudson River group in the valley of the Hudson; comparison of the Hudson River section with the section in Loraine, Jefferson county, N. Y., and the Cincinnati section of southern Ohio; some observations on the use of the names "Hudson River," "Lorraine," and "Cincinnati."

THE CALCIFEROUS FORMATION IN THE CHAMPLAIN VALLEY. Ezra Brainerd and H. M. Seely, Middlebury, Vt.—This paper describes the series of Champlain Valley rocks, and presents the results of the authors' study of the Calciferous and its relations to the groups above and below. The observations have led to important conclusions, involving serious modifications of the section as generally accepted.

THE STRATIGRAPHY OF THE QUEBEC GROUP. R. W. Ellis, Ottawa, Canada.—The author discusses, first, all the structure as found in the southeastern part of the province adjoining Maine and New Hampshire, including the crystalline and metamorphic rocks and their associated formations; and subsequently the unaltered Quebec group as developed along the south side of the St. Lawrence. He contrasts the views formerly held regarding the stratigraphical position of the several divisions with those now believed to be the correct interpretation. The new views of structure of the St. Lawrence area have been largely confirmed very recently by the work of Prof. Lapworth and others from the palæontological standpoint.

GEOLOGICAL AND PETROGRAPHICAL OBSERVATIONS IN SOUTHERN AND WESTERN NORWAY. George H. Williams, Baltimore, Md.—The regions studied in southern Norway are of typical eruptive rocks breaking through horizontal and unaltered Silurian beds, and therefore unexcelled as examples of contact metamorphism. The localities visited in western Norway, on the other hand, are greatly disturbed and have been subjected to extensive regional metamorphism. In each case, both eruptive and sedimentary masses have been involved, but neither have so completely lost their original characters by metamor-

phism as to be incapable of identification. The two main points which it is desired to illustrate are: I. The similarity of effects produced in the same original material by the contact action of eruptive rocks and by orographic disturbance. II. The power of orographic forces (regional metamorphism) to produce the same product from rocks originally the most diverse in origin and structure. Illustrated by maps, diagrams, and specimens, both macroscopic and microscopic.

NOTE ON THE SYRACUSE SERPENTINE. George H. Williams, Baltimore, Md.—Additional and recently secured evidence of the eruptive nature of this rock, which is interesting as being the only representative of its class known in the undisturbed strata of New York.

THE SANDSTONE DIKES OF THE FORKS OF COTTONWOOD CREEK IN TEHAMA AND SHASTA COUNTIES, CALIFORNIA. J. S. Dilier, Washington, D. C.—The distribution of the dikes was shown by a map, their mode of occurrence described and illustrated by lantern slides; their mineralogical composition, microscopical structure, and chemical composition discussed and compared with that of the mesozoic sandstones with which they are associated; and a theory of the origin of the dikes proposed and discussed.

ON THE RELATION BETWEEN THE MINERAL COMPOSITION AND THE GEOLOGICAL OCCURRENCE OF THE IGNEOUS ROCKS AT ELECTRIC PEAK AND SEPULCHRE MT., YELLOWSTONE NATIONAL PARK. Jos. P. Iddings, Washington, D. C.—An occurrence of intrusive rocks and contemporaneous extravasated rocks having similar chemical composition and different mineral composition and structure.

ON OROGRAPHIC MOVEMENTS IN THE ROCKY MOUNTAINS REGION. S. F. Emmons, Washington, D. C.—After giving a brief abstract of the views which have hitherto been put forward in regard to orographic movements in the Rocky Mountains region, the writer proceeds to give his present views, founded on observations made in the field during the past ten years, which partially modify the views already held, and add to the list of movements two important and widespread movements, which hitherto have not been generally recognized. These occurred, the one during the Carboniferous, the other during Jurassic times. Evidence of the former is found beyond the boundaries of Colorado in Wyoming at the North and New Mexico on the South. The latter was even more widely felt and may have affected the greater part of the continent. Although the data are extremely imperfect, the writer has thought it advisable to present the facts which he has at his command, believing that when the attention of geologists is called to



them, they may be able to detect further evidence, where, without this suggestion, they might not look for it.

ON CERTAIN PECULIAR STRUCTURAL FEATURES IN THE FOOTHILL REGION OF THE ROCKY MOUNTAINS NEAR DENVER, COLORADO. Geo. H. Eldridge, Washington, D. C.—The paper describes a type of geological structure discovered by the writer, which may prove of common occurrence along the base of the Rocky Mountains. The type consists in a succession of nonconformities appearing one after another at various geological horizons, the explanation of which is found in the forces acting in the general uplift of the Colorado Range, from which have been developed certain secondary forces, which have, from point to point, brought about the elevations upon which the nonconformities depend.

ON THE INTRUSIVE ORIGIN OF THE TRIASSIC TRAPS OF NEW JERSEY ; WITH SPECIAL REFERENCE TO WATCHUNG MOUNTAINS. Frank L. Nason, New Brunswick, N. J.—That these traps are intrusive in their origin is proved : I. By the peculiar monoclinical structure of the sandstones, which are produced by longitudinal fractures extending parallel (a) to the major axis of the trap ridges, and (b) to the major axis of the Archæan region. II. By the finding of *Estheria ovata* in repeated lines along the Delaware River, and in lines reaching N. E. and S. W. across the State. III. By the lines of cross-fracture extending N. W. and S. E. across the formation, which are proved (a) by showing a repetition of the slates and gray sandstones at Weehawken and Shady Side ; (b) by showing that the Pequannock River flows in a fault ; (c) by showing that the streams of the Archæan region flow in faults parallel to the “crescents” of the trap.

**Association of American Anatomists.**—The second annual meeting was held at the University of Pennsylvania, Thursday, December 26, 1889. The following communications were made : President's Address ; by Joseph Leidy, M.D., of Philadelphia, Pa. Address of the Chairman of the Executive Committee ; by Harrison Allen, M.D., of Philadelphia, Pa. Muscular Anomalies of the Infra-Clavicular Region ; by Frank Baker, M.D., of Washington, D. C. On Plant Anatomy and Physiology ; by W. P. Wilson, M.D., of Philadelphia, Pa. Brief Remarks on the Form and Probable Function of the Blood Plaque, with slides and photographs ; by George T. Kemp, Ph.D. Presentation of Histological Specimens ; by George A. Pierisol, M.D., Philadelphia, Pa. The Supra-Sternal Rib ; by D. S. Lamb, M.D., of Washington, D. C. A Demonstration ; by Horace Jayne,

M.D., Philadelphia, Pa. A Paper,—title unannounced; by Wm. Browning, M.D., Brooklyn, N. Y. The Relation of the Thalmus to the Parocœle (lateral ventricle), especially in the Apes; by Burt G. Wilder, M.D., Ithaca, N. Y. Nuclear Anatomy of the Cetacean, Manatee, Phocidæ, and Hippopotamus Cord; by E. C. Spitzka, New York.

Friday, Dec. 27th.—The Spinal Nerves of the Cat (advance communication); by T. B. Stowell, Ph.D., Pottsdam, N. Y. The Transition from Stratified to Columnar Epithelium; by Simon H. Gage, Ithaca, N. Y. A Series of Casts of the Duodenum, with remarks; by Thomas Dwight, M.D., Boston, Mass. The Preparation and Preservation of Anatomical Specimens for Museums (illustrated with specimens); by J. L. Wortman, M.D., Washington, D. C. Notes on Dwarfs; by Frank Baker, M.D., Washington, D. C. Olecranon Perforation; by D. S. Lamb, M.D., Washington, D. C. The Physical Theory of the Genesis of the Long Bones and Articulations; by John A. Ryder, M.D., Philadelphia, Pa. Individual Skeletal Variations; by Frederick A. Lucas, Washington, D. C. Medico-Legal Studies on the Human Skeleton; by Thomas Dwight, M.D., Boston, Mass. On the Value of the Studies of Variation; by Harrison Allen, M.D., Philadelphia, Pa. The Heart as a Basis of Intrinsic Toponymy; by Burt G. Wilder, M.D., Ithaca, N. Y. Presentation of Specimens; by Geo. McClellan, M.D., Philadelphia, Pa.

Saturday, Dec. 27.—Presentation of Specimens; by S. J. J. Harger V.M.D., Philadelphia, Pa. Presentation of Specimens; by John B. Deaver, M.D., Philadelphia, Pa. Presentation of Specimens; by A. H. P. Leuf, M.D., Philadelphia, Pa. Volunteer contributions. Inspection of Veterinary Department.

The following officers were elected: President, Joseph Leidy, M.D.; First Vice President, Frank Baker, M.D.; Second Vice President, Fanueill D. Weisse, M.D.; Secretary and Treasurer, A. H. P. Leuf, M.D.; Executive Committee, Harrison Allen, M.D., Chairman, Burt G. Wilder, M.D., William Towles, M.D., the President and Secretary.